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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/678,611	10/04/2000	Kohji Sakai	198004US2	7156
22850	7590	11/05/2004	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.			PHAM, HAI CHI	
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ALEXANDRIA, VA 22314			PAPER NUMBER	

2861

DATE MAILED: 11/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/678,611	Applicant(s) SAKAI ET AL.	
	Examiner Hai C Pham	Art Unit 2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 October 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statements filed 07/09/04, 08/06/04 and 09/13/04 have been received. They have been placed in the application file, and the information referred to therein has been considered by the examiner

Drawings

2. The drawings are objected to because of the following minor informalities:

- Each of the following Figures 4, 9, 14, 19, 24 and 29 has a description title "CURVATURE OF FIFLD" that should be read --CURVATURE OF FIELD--.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of

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the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Allowable Subject Matter

3. The indicated allowability of claims 11 and 13 is withdrawn in view of the newly discovered reference to Ono (U.S. 6,130,768). Rejections based on the newly cited reference follow.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

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5. Claims 1-3, 5-9, 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Takada et al. (U.S. 6,445,483).

Takada et al. discloses an optical scanning apparatus condensing a beam deflected by an optical deflector (polygon mirror 3) so as to form a beam spot on a surface to be scanned (surface 14), comprising two lenses (first and second scanning lenses 12 and 13, Fig. 1), wherein:

- a lens (first scanning lens 12) on the side of the optical deflector has a negative refracting power in sub-scanning direction (the radius of the entrance surface of the first scanning lens 12, e.g., 72.17772, being larger than the radius of the exit surface of the first scanning lens, e.g., 53.03585) (Table 1),
- a lens (second scanning lens 13) on the side surface to be scanned has a positive refracting power in the sub-scanning direction, and at least one lens surface of the lens surfaces of the two lenses is such that a shape in the sub-scanning section is a non-arc shape (second scanning lens 13 having the exit surface being non-arcuate and having a positive refractive power in the sub-scanning direction) (col. 12, lines 34-59).

Takada et al. further teaches:

- The surface such that a shape in a sub-scanning direction is a non-arc shape is a sub-non-arc surface such that the non-arc shape changes according to the position in main scanning direction of the sub-scanning direction (the exit surface of the second scanning lens 13 being aspherical in the main scanning direction

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and having a large curvature in the main scanning direction) (col. 12, lines 49-59),

- A shape of the sub-non-arc surface in a main scanning section is a non-arc shape (col. 12, lines 49-59),
- Said optical system comprises an anamorphic optical system (col. 7, lines 45-60),
- In each of the four lens surfaces of the two lenses, the curvatures in the main and sub-scanning directions are different from one another (col. 12, lines 34-59),
- The spot diameter in each of the main and sub-scanning directions is equal to or smaller than 50 μm (col. 4, lines 54-59),
- A non-arc amount, which is an amount of difference of the non-arc shape in the sub-scanning section of the sub-non-arc from an arc, changes asymmetrically in the main scanning direction (the anamorphic scanning lens 13 having curvature difference between the main and sub-scanning directions and further having a thickness, which differs from one end to the other end of the lens in the sub-scanning direction) (col. 7, lines 4-21),
- The optical scanning device being a single beam system.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takada et al.

Takada et al. teaches the lateral magnification in the sub-scanning direction being set at 0.418 (col. 15, lines 60-61), but fails to disclose the claimed range values.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to set the lateral magnification in the sub-scanning direction within the desired range values as claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

8. Claims 10, 12, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takada et al. in view of Yamawaki et al. (U.S. 6,046,835).

Takada et al. discloses all the basic limitations of the claimed invention including the two scanning lenses being separate and having an air separation therebetween, but except for the relationship between the lateral magnification in the sub-scanning direction at a central height and that at any image height and the plurality of light emitting sources.

Yamawaki et al. discloses a scanning optical apparatus comprising two laser units (21a and 21b), two scanning lenses (3 and 4) using a single polygon mirror for simultaneously deflecting and scanning the two light beams across the surface of the photosensitive drum (10) forming scan lines separate from each other in the sub-

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scanning direction, wherein the ratio between the lateral magnifications in the sub-scanning direction at respective on-axis and off-axis is set at 1.0 and can be increased by 8%, a range that clearly meets the claimed condition (see table 2 and associated discussions).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to set the ratio of the lateral magnifications at the above value as taught by Yamawaki et al. in the device of Takada et al. The motivation for doing so would have been to provide a high quality image without being affected by the temperature change.

9. Claims 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takada et al. in view of Ono (U.S. 6,130,768).

Takada et al. discloses all the basic limitations of the claimed invention except for the relationship between the effective writing width and the width of sub-scanning curvature of field.

Ono teaches an optical scanning apparatus having two scanning image forming lenses (6 and 7) in which the curvature of field in the sub-scanning direction is satisfactorily corrected by maintaining the absolute value of the curvature of field in the sub-scanning direction of about 1 mm or less, and wherein the width of the sub-scanning curvature of field in the effective writing width ($161.5 \text{ mm} \times 2 = 323 \text{ mm}$) satisfies the following condition:

$$1 \text{ mm} / 323 \text{ mm} = 0.003 < 0.005$$

(see Fig. 3A and associated discussions at col. 15, lines 1-11).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to keep the absolute value of the curvature of field in the sub-scanning direction small as taught by Ono in the Takada et al. device. The motivation for doing so would have been to accurately correct all the aberrations in order to allow more accurate printing as suggested by Ono at col. 1, lines 43-55.

10. Claims 17-18, 20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takada et al. in view of Yamawaki et al., as applied to claims 1, 14, 16 above, and further in view of Ota et al. (U.S. 5,305,022).

Takada et al., as modified, discloses all the basic limitations of the claimed invention except for the plurality of light sources being provided as a laser array with the interval of the light emitting points equal to or larger than 10 μm , and the developer.

Ota et al. discloses a multi-beam scanning recording apparatus having a semiconductor laser array for simultaneously scanning the surface of the photosensitive drum to form an electrostatic latent image, which is developed to become a visible toner image, wherein the interval between the light emitting sources in the semiconductor laser array can be set at least at 10 μm (col. 1, lines 36-48).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide a semiconductor laser array as taught by Ota et al. in the modified device of Takada et al. for the purpose of providing a high-speed optical scanning device.

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11. Claims 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takada et al. in view of Ota et al.

Takada et al. discloses all the basic limitations of the claimed invention except for the developer for visualization.

However it is old and well known in the art that a latent image is formed by the scanning of the laser beam on the surface of the photosensitive drum, and that the latent image is then developed to become a visible toner image as evidenced by Ota et al. at col. 1, lines 24-28.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the developer unit in the modified device of Takada et al. since Ota et al. teaches this to be known in the printing art to visualize the latent image into a toner image.

Response to Arguments

12. Applicant's arguments filed 08/23/04 have been fully considered but they are not persuasive.

With regard to Applicants' argument that Takada employs a configuration of the optical scanning device where "the entire configuration including the transfer optics must be considered as a whole" along with the first and second scanning lenses 12 and 13, that would make the three-lens configuration of Takada different from the claimed invention, the Examiner respectfully disagrees. The transfer optics (lenses 7, 9 and 10)

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of Takada are solely used for re-focusing and/or converging the light beam in the sub-scanning direction in the vicinity of the reflecting surface of the polygon mirror (3) and are not part of the scanning image forming lenses (12 and 13), which have specific characteristics for achieving a constant velocity function and a conjugating function for compensating for a tilt or positional error of the reflecting plane of the polygon mirror. Therefore, the transfer optic could not be considered as part of lenses necessary for forming image on the surface to be scanned.

Contrary to Applicants' statement that "since the radius of the entrance surface of 72.17772 is larger than the radius of the exit surface of 53.03585, it is presumed that it [the first scanning lens] has a positive power", such configuration would produce a negative refractive power in the first scanning lens. Based on the same Table 1 at col. 14 of Takada, the radius of the entrance surface of the second scanning lens (wrongly designated as second transfer lens) of 1148.78167 is smaller than the radius of the exit surface of the second scanning lens of 4146.00073, and the second scanning lens is indicated to have a positive refractive power.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Talbott L. David can be reached on (571) 272-1934. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



HAI PHAM
PRIMARY EXAMINER
November 3, 2004